CLAIMS

WHAT IS CLAIMED:

1. A method comprising:

operating a field emitter array (FEA) to generate at least one of a high electric field and a high electron flux;

exposing the field emitter array (FEA) to at least one gas; and

generating at least one radical species from the at least one gas exposed to the at least one of the high electric field and the high electron flux.

2. The method of claim 1, wherein operating the field emitter array (FEA) comprises operating the field emitter array (FEA) to generate an electric field having a field strength in a range of about 10^7-10^8 V/cm.

3. The method of claim 1, wherein operating the field emitter array (FEA) comprises operating the field emitter array (FEA) to generate an electron flux in a range of about 0.5-2.0 Amp/cm^2.

4. The method of claim 1, wherein operating the field emitter array (FEA) comprises operating the field emitter array (FEA) with voltages of no more than about 100 V.

5. The method of claim 1, wherein exposing the field emitter array (FEA) to the at least one gas comprises exposing the field emitter array (FEA) to molecular oxygen (O_2).

6. A method comprising:

operating a field emitter array (FEA) with voltages of no more than about 1000 V to generate at least one of a high electric field and a high electron flux;

exposing the field emitter array (FEA) to at least one gas; and

generating at least one radical species from the at least one gas exposed to the at least one of the high electric field and the high electron flux.

7. The method of claim 6, wherein operating the field emitter array (FEA) comprises operating the field emitter array (FEA) to generate an electric field having a field strength in a range of about 10^7-10^8 V/cm.

8. The method of claim 6, wherein operating the field emitter array (FEA) comprises operating the field emitter array (FEA) to generate an electron flux in a range of about 0.5-2.0 Amp/cm^2.

9. The method of claim 6, wherein operating the field emitter array (FEA) comprises operating the field emitter array (FEA) with voltages of no more than about 100 V.

10. The method of claim 6, wherein exposing the field emitter array (FEA) to the at least one gas comprises exposing the field emitter array (FEA) to molecular oxygen (O_2).

11. A method comprising:

operating a low-power field emitter array (FEA) to generate at least one of a high electric field and a high electron flux;

exposing the low-power field emitter array (FEA) to at least one gas;

generating at least one radical species from the at least one gas exposed to the at least one of the high electric field and the high electron flux; and

reacting the at least one radical species with at least one of a chemical and a biological toxin.

12. The method of claim 11, wherein operating the low-power field emitter array (FEA) comprises operating the low-power field emitter array (FEA) to generate an electric field having a field strength in a range of about 10^7-10^8 V/cm.

13. The method of claim 11, wherein operating the low-power field emitter array (FEA) comprises operating the low-power field emitter array (FEA) to generate an electron flux in a range of about 0.5-2.0 Amp/cm^2.

14. The method of claim 11, wherein operating the low-power field emitter array (FEA) comprises operating the low-power field emitter array (FEA) with voltages of no more than about 100 V.

15. The method of claim 11, wherein exposing the low-power field emitter array (FEA) to the at least one gas comprises exposing the low-power field emitter array (FEA) to molecular oxygen (O_2).

16. A method comprising:

operating a low-power field emitter array (FEA) with voltages of no more than about 1000 V to generate at least one of a high electric field and a high electron flux;

exposing the low-power field emitter array (FEA) to at least one gas;

generating at least one radical species from the at least one gas exposed to the at least one of the high electric field and the high electron flux; and

reacting the at least one radical species with at least one of a chemical and a biological toxin.

17. The method of claim 16, wherein operating the low-power field emitter array (FEA) comprises operating the low-power field emitter array (FEA) to generate an electric field having a field strength in a range of about 10^7-10^8 V/cm.

18. The method of claim 16, wherein operating the low-power field emitter array (FEA) comprises operating the low-power field emitter array (FEA) to generate an electron flux in a range of about 0.5-2.0 Amp/cm^2.

19. The method of claim 16, wherein operating the low-power field emitter array (FEA) comprises operating the low-power field emitter array (FEA) with voltages of no more than about 100 V.

20. The method of claim 16, wherein exposing the low-power field emitter array (FEA) to the at least one gas comprises exposing the low-power field emitter array (FEA) to molecular oxygen (O_2).

21. A method comprising:

operating a low-power field emitter array (FEA) to generate at least one of a high electric field and a high electron flux;

exposing the low-power field emitter array (FEA) to at least one of a chemical and a biological toxin; and

dissociating the at least one of the chemical and the biological toxin exposed to the at least one of the high electric field and the high electron flux.

22. The method of claim 21, wherein operating the low-power field emitter array (FEA) comprises operating the low-power field emitter array (FEA) to generate an electric field having a field strength in a range of about 10^7-10^8 V/cm.

23. The method of claim 21, wherein operating the low-power field emitter array (FEA) comprises operating the low-power field emitter array (FEA) to generate an electron flux in a range of about 0.5-2.0 Amp/cm^2.

24. The method of claim 21, wherein operating the low-power field emitter array (FEA) comprises operating the low-power field emitter array (FEA) with voltages of no more than about 100 V.

25. The method of claim 21, wherein operating the low-power field emitter array (FEA) comprises operating the low-power field emitter array (FEA) with a cathode-to-gate distance of not more than about 1 micron (1μm).

26. A method comprising:

operating a low-power field emitter array (FEA) with voltages of no more than about 1000 V to generate at least one of a high electric field and a high electron flux;

exposing the low-power field emitter array (FEA) to at least one of a chemical and a biological toxin; and

dissociating the at least one of the chemical and the biological toxin exposed to the at least one of the high electric field and the high electron flux.

27. The method of claim 26, wherein operating the low-power field emitter array (FEA) comprises operating the low-power field emitter array (FEA) to generate an electric field having a field strength in a range of about 10^7-10^8 V/cm.

28. The method of claim 26, wherein operating the low-power field emitter array (FEA) comprises operating the low-power field emitter array (FEA) to generate an electron flux in a range of about 0.5-2.0 Amp/cm^2.

29. The method of claim 26, wherein operating the low-power field emitter array (FEA) comprises operating the low-power field emitter array (FEA) with voltages of no more than about 100 V.

30. The method of claim 26, wherein operating the low-power field emitter array (FEA) comprises operating the low-power field emitter array (FEA) with a cathode-to-gate distance of not more than about 1 micron (1μm).

31. A method comprising:

operating a low-power field emitter array (FEA) with gate openings in a range of about 1 micron (1 μm) to about 1 millimeter (1 mm) to generate at least one of a high electric field and a high electron flux;

exposing the low-power field emitter array (FEA) to at least one of a chemical and a biological toxin; and

dissociating the at least one of the chemical and the biological toxin exposed to the at least one of the high electric field and the high electron flux.

32. The method of claim 31, wherein operating the low-power field emitter array (FEA) comprises operating the low-power field emitter array (FEA) to generate an electric field having a field strength in a range of about 10^7-10^8 V/cm.

33. The method of claim 31, wherein operating the low-power field emitter array (FEA) comprises operating the low-power field emitter array (FEA) to generate an electron flux in a range of about 0.5-2.0 Amp/cm^2.

34. The method of claim 31, wherein operating the low-power field emitter array (FEA) comprises operating the low-power field emitter array (FEA) with voltages of no more than about 100 V.

35. The method of claim 31, wherein operating the low-power field emitter array (FEA) comprises operating the low-power field emitter array (FEA) with a cathode-to-gate distance in a range of about 1 micron (1 μm) to about 1 millimeter (1 mm).

36. A method comprising:

operating a low-power field emitter array (FEA) with voltages of no more than about 1000 V with gate openings in a range of about 1 micron (1 μm) to about 1 millimeter (1 mm) to generate at least one of a high electric field and a high electron flux;

exposing the low-power field emitter array (FEA) to at least one of a chemical and a biological toxin; and

dissociating the at least one of the chemical and the biological toxin exposed to the at least one of the high electric field and the high electron flux.

37. The method of claim 36, wherein operating the low-power field emitter array (FEA) comprises operating the low-power field emitter array (FEA) to generate an electric field having a field strength in a range of about 10^7-10^8 V/cm.

38. The method of claim 36, wherein operating the low-power field emitter array (FEA) comprises operating the low-power field emitter array (FEA) to generate an electron flux in a range of about 0.5-2.0 Amp/cm^2.

39. The method of claim 36, wherein operating the low-power field emitter array (FEA) comprises operating the low-power field emitter array (FEA) with voltages of no more than about 100 V.

40. The method of claim 36, wherein operating the low-power field emitter array (FEA) comprises operating the low-power field emitter array (FEA) with a cathode-to-gate distance in a range of about 1 micron (1 μm) to about 1 millimeter (1 mm).

41. A method comprising:

operating a field emitter array (FEA) to generate at least one of a high electric field and a high electron flux;

exposing the field emitter array (FEA) to at least one of a chemical and a biological toxin; and

ionizing the at least one of the chemical and the biological toxin exposed to the at least one of the high electric field and the high electron flux.

42. The method of claim 41, wherein operating the field emitter array (FEA) comprises operating the field emitter array (FEA) to generate an electric field having a field strength in a range of about 10^7-10^8 V/cm.

43. The method of claim 41, wherein operating the field emitter array (FEA) comprises operating the field emitter array (FEA) to generate an electron flux in a range of about 0.5-2.0 Amp/cm^2.

44. The method of claim 41, wherein operating the field emitter array (FEA) comprises operating the field emitter array (FEA) with voltages of no more than about 100 V.

45. The method of claim 41, wherein operating the field emitter array (FEA) comprises operating the field emitter array (FEA) with a cathode-to-gate distance of not more than about 1 micron (1μm).

46. A method comprising:

operating a field emitter array (FEA) with voltages of no more than about 1000 V to generate at least one of a high electric field and a high electron flux;

exposing the field emitter array (FEA) to at least one of a chemical and a biological toxin; and

ionizing the at least one of the chemical and the biological toxin exposed to the at least one of the high electric field and the high electron flux.

47. The method of claim 46, wherein operating the field emitter array (FEA) comprises operating the field emitter array (FEA) to generate an electric field having a field strength in a range of about 10^7-10^8 V/cm.

48. The method of claim 46, wherein operating the field emitter array (FEA) comprises operating the field emitter array (FEA) to generate an electron flux in a range of about 0.5-2.0 Amp/cm^2.

49. The method of claim 46, wherein operating the field emitter array (FEA) comprises operating the field emitter array (FEA) with voltages of no more than about 100 V.

50. The method of claim 46, wherein operating the field emitter array (FEA) comprises operating the field emitter array (FEA) with a cathode-to-gate distance of not more than about 1 micron (1μm).

51. A method comprising:

operating a field emitter array (FEA) with gate openings in a range of about 1 micron (1 μm) to about 1 millimeter (1 mm) to generate at least one of a high electric field and a high electron flux;

exposing the field emitter array (FEA) to at least one of a chemical and a biological toxin; and

ionizing the at least one of the chemical and the biological toxin exposed to the at least one of the high electric field and the high electron flux.

52. The method of claim 51, wherein operating the field emitter array (FEA) comprises operating the field emitter array (FEA) to generate an electric field having a field strength in a range of about 10^7-10^8 V/cm.

53. The method of claim 51, wherein operating the field emitter array (FEA) comprises operating the field emitter array (FEA) to generate an electron flux in a range of about 0.5-2.0 Amp/cm^2.

54. The method of claim 51, wherein operating the field emitter array (FEA) comprises operating the field emitter array (FEA) with voltages of no more than about 100 V.

55. The method of claim 51, wherein operating the field emitter array (FEA) comprises operating the field emitter array (FEA) with a cathode-to-gate distance in a range of about 1 micron (1 μm) to about 1 millimeter (1 mm).

56. A method comprising:

operating a field emitter array (FEA) with voltages of no more than about 1000 V with gate openings in a range of about 1 micron (1 μm) to about 1 millimeter (1 mm) to generate at least one of a high electric field and a high electron flux;

exposing the field emitter array (FEA) to at least one of a chemical and a biological toxin; and

ionizing the at least one of the chemical and the biological toxin exposed to the at least one of the high electric field and the high electron flux.

57. The method of claim 56, wherein operating the field emitter array (FEA) comprises operating the field emitter array (FEA) to generate an electric field having a field strength in a range of about 10^7-10^8 V/cm.

58. The method of claim 56, wherein operating the field emitter array (FEA) comprises operating the field emitter array (FEA) to generate an electron flux in a range of about 0.5-2.0 Amp/cm^2.

59. The method of claim 56, wherein operating the field emitter array (FEA) comprises operating the field emitter array (FEA) with voltages of no more than about 100 V.

60. The method of claim 56, wherein operating the field emitter array (FEA) comprises operating the field emitter array (FEA) with a cathode-to-gate distance in a range of about 1 micron (1 μm) to about 1 millimeter (1 mm).